

UNIVERSITY OF ILLINOIS BULLETIN

ISSUED WEEKLY

Vol. XXII

OCTOBER 13, 1924

No. 7

[Entered as second-class matter December 11, 1912, at the post office at Urbana, Illinois, under the Act of August 24, 1912. Acceptance for mailing at the special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 31, 1918.]

BUREAU OF EDUCATIONAL RESEARCH CIRCULAR NO 31

BUREAU OF EDUCATIONAL RESEARCH
COLLEGE OF EDUCATION

THE PLANNING OF TEACHING

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with

COOPERATION OF TEACHERS OF THE UNIVERSITY HIGH SCHOOL



PUBLISHED BY THE UNIVERSITY OF ILLINOIS
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THE PLANNING OF TEACHING

A lesson plan necessary for good teaching. A teacher should never go before a class without having previously prepared definite plans for the work of the period. It is not sufficient for him to be thoroughly familiar with the subject-matter being studied; in addition, he must have a carefully prepared plan for the conduct of the recitation. As a part of his preparation the teacher should determine the topics, if any, to be reviewed, and the points to be taken up in the advanced work; he should formulate the central or pivotal questions to be asked, and should devise plans for diagnosis or discovery of faults in the learning of his students. Until a teacher has become very familiar with the teaching of a subject he should prepare a somewhat detailed lesson plan. Setting one's ideas down in writing usually assists in clarifying and organizing them. Thus teachers who write out their lesson plans usually prepare better ones than those who do not. If the plan is not reduced to writing the teacher is likely to forget portions of it during the recitation, and also, which is more important, to slight the planning of the lesson.

Immediate objectives defined in terms of student achievements. A preliminary step in the planning of a lesson is the determination of the particular achievements to be expected of the students as a result of their study of the lesson both in preparation and during the class period. The attainment of these achievements constitutes the immediate objectives or the aim of the lesson.

It is essential that these achievements be described in as specific terms as possible. If the outcome of the learning is to be knowledge, the particular facts and principles should be specified; for example, ability to solve a quadratic equation of the type $x^2 - 7x + 12 = 0$ by factoring; ability to read a history text for the purpose of determining the important facts; ability to understand Boyles' Law; ability to recall promptly the important dates, events, and other facts previously studied in history. (The teacher should write out tentative lists.) Such objectives as the following are too general and indefinite: to understand the War of 1812; to study the circle in geometry; to read the first act of the Merchant of Venice; to appreciate the legend of Sleepy Hollow; to learn about sound.

Immediate objectives should be expressed in terms of student achievements rather than of learning exercises to be done, because the reading of a text, the answering of questions, the solving of problems, etc., are only a means to an end, the attainment of certain achievements. Thus the aim of a lesson in algebra is not the doing of certain exercises but the acquiring of certain knowledge and habits. The aim of a lesson in history is not the reading of certain pages in a book, or even the answering of certain questions, but the acquiring of certain knowledge and perhaps ideals and attitudes. This may appear to be a very subtle point and one of minor importance with reference to the making of lesson plans, but the teacher's concept of the aim of the lesson is likely to influence materially his plans and his teaching.

The ultimate aims of education should, of course, be kept in mind, but they are not sufficient to serve as a direct guide in the daily work with the class. They are too remote and general. Their function is that of general criteria to guide the teacher in formulating his immediate objectives so that they will be compatible with the purpose of education.

Two aspects of lesson planning. The teacher's task is to stimulate and direct students in their learning. This fundamental concept of the work of a teacher suggests two aspects of a lesson plan. It should state or at least imply the things which the students are expected to do, that is, the learning exercises in which they will be asked to engage in order to attain the objectives set for them. The other aspect relates to the activities of the teacher in getting his students to do these things, and in directing their doing. In other words, the teacher should plan not only what he is to do during the class period, but also what the students are to do. Many teachers fail to make good plans because they do not make adequate provisions for student activity. For this reason it is desirable for a teacher to emphasize this aspect of his plans. If he finds that they tend to be weak in this respect, he may adopt the device of listing the provisions for student activity in a separate column. A teacher is successful only as he succeeds in getting his students to be actively engaged in doing the right things.

The scope of a lesson plan. In general a lesson plan should provide for:

1. Review of the work of the preceding day, and in some cases extending over a longer period;

2. Study of the assignment to supplement the preparation already made by the members of the class;

3. Advanced assignment.

The time devoted to review will vary. Sometimes it may occupy most of the class period. At other times it may be omitted altogether. When a new topic is taken up, the entire recitation may be devoted to the advanced assignment. When the study of a topic extends over two or three days it will happen frequently that little time after the first day will be required for the advanced assignment, since the students are to continue work on the assignment already made. As the time to be devoted to review and to the advanced assignment varies, there will be a corresponding variation in the time available for supplementing the pupils' preparation of the lesson. Consequently the plan for some lessons will be devoted largely to review; for others it will deal only with the assignment; and for still others it will omit both the review and the assignment.

A lesson plan usually should be an integral part of a larger unit.

The lesson for a single day almost always constitutes a portion of some larger unit of the course. It cannot be planned effectively without taking into consideration its relation to the other phases of the topic or unit of work. The proper procedure is to outline the larger unit, subdivide it into daily lessons, and then plan each of these in detail and in relation to each other as a group and not as isolated lessons. This will lead the teacher to see what is coming in the future and to relate the work of the present to that which will follow. It will very materially assist in preventing fragmentary learning such as tends to develop if each day's lesson is planned independently of those which are to come.

A lesson plan should not be followed slavishly. Although it is important that the teacher prepare a complete lesson plan, it should not be followed slavishly. Even the teacher who knows his students well, will not be able to anticipate all of the conditions that will arise. The review may reveal unexpected weaknesses; students may ask questions which the teacher has not anticipated. A good teacher will not hesitate to modify his plan at any time so as to adapt his instruction to the revealed needs and interests of his class even though it may mean a radical departure from his carefully prepared plan. On the other hand he will avoid being misled by questions not pertinent to the lesson and will depart from his plan only when he believes there are good reasons for doing so.

Illustrations of lesson plans. Through the cooperation of Principal L. W. Williams of the University High School, a number of lesson plans were secured from his teachers. These are representative of the planning which these teachers are accustomed to do in preparing for their regular teaching. They are reproduced on the following pages as examples of practical lesson plans rather than as perfect models. It is believed, however, that they illustrate the application of sound educational principles. Except for minor editorial changes, made usually in order to economize space, the plans are reproduced as contributed by the various teachers. Each plan outlines the work for two days. In most cases the one for the first day includes the assignment made on the preceding day. The advanced assignment to be made on the second day has been omitted. Some variations in terminology and form will be noted. This is due in part to the differences in subject-matter and in part to the individuality of the teachers. A number of statements have been abbreviated but this is not inappropriate in lesson plans since in general they will not be read by anyone other than the teacher who prepared them. In some cases explanatory statements have been inserted, which do not usually appear in lesson plans, in order to assist the reader in understanding the proposed procedures.

No one of the plans specifically represents a single type of learning and no single plan in its entirety illustrates those types of lessons commonly called "drill," "development," "review," or "assignment." Rather they give us a cross section of practical classroom procedures in which various types of learning are represented. Examples of a drill lesson are found in Plans Nos. 5 and 6, a development lesson in a content subject in Plan No. 3, an effective review device in Plan No. 7 (laboratory section), and illustrations of the presentation and of the assignment in Plans Nos. 1, 4 and 7 (Lesson 1). Certain plans approximate a complete example of a type of learning, and attention is called to Nos. 1, 3 and 4, as illustrative of reflective thinking, to Plan No. 2, as illustrative of training in enjoyment, and to Plan No. 6 as an example of associating symbols and meanings.

Abbreviated lesson plans. The lesson plans reproduced here will doubtless impress the reader as being elaborate, perhaps unnecessarily so. This is partly because it has been necessary to include some explanatory statements so that the proposed procedures will be understood by the reader. It is realized that the actual plans prepared by many successful teachers are much less elaborate. After

the teacher has had a year or two of experience, an abbreviated plan frequently will be satisfactory. On the other hand, an abbreviated plan may not represent thoughtful planning, and in such a case is to be condemned. A teacher should make certain that he has made adequate preparation for each day's work and this will usually require that he has planned his teaching in considerable detail.

PLAN NO. 1

PHYSICS

Prepared by J. W. APPLING

LESSON I.

I. Aim. To study the heating and ventilating system of the University High School with special emphasis upon the principles involved. (The class has already studied most of the principles involved.)

II. Assignment (made at preceding meeting of class):

1. Questions to *start thinking* and some discussion:

(a) What devices do you see in this room which might be related to heating or ventilating?

(b) Why use two thermometers in each room?

(c) Why do some pipes in the room have a covering while others do not?

(d) What is the source of heat for our system?

(e) Can this room be kept at a uniform temperature all day?

(f) How does a compressed air thermostat operate?

2. Reference: "Practical Physics." Millikan and Gale. p. 210-13.

III. Presentation of new material.

*Facts or principles to
be taught*

1. Steam heating coils are used to help heat the room. (There are no ordinary steam radiators in the room.)

2. Warm air is used to help heat the room. (The Beery System is used.)

*Methods used to teach each
fact or principle*

1. (a) What are the horizontal pipes near the ceiling used for?

(b) Are these sufficient to heat the room?

(c) Why are some pipes covered?

2. (a) Can air which is used for ventilating be used to help heat the room? How?

(b) Where could such air enter the room?

(c) How can we determine where the air enters? (Demonstration using candle flame.)

(d) Heated air is lighter or heavier than cooler air?

(e) How do you account for the heated air entering above and leaving through vents near the floor?

(f) Ask pupil to sketch on the blackboard direction of air currents in the classroom.

3. Thermostats are the automatic devices which regulate temperature. Their operation depends upon the bending of a bimetallic bar due to unequal expansions caused by heat. This bending finally operates compressed air valves, the compressed air then regulates steam valves and air dampers.

3. (a) How does the room maintain so uniform a temperature?

(b) Describe how a thermostat operates.

(c) The principle and operation of the thermostat is shown by an excellent film which can be borrowed from the Johnson Service Company (Milwaukee). This film contains a good series of animated drawings, which show very clearly how the thermostat works. As a substitute, their catalogs and descriptive matter are very good.

4. The success of this system depends (1) upon everyone in the school *knowing* the importance of keeping windows and doors closed; (2) upon everyone in the school *cooperating*.

4. (a) The teacher opens a window. Just how does this open window affect the air currents (1) in the room? (2) in the building?

(b) How can the importance of keeping windows and doors closed be impressed on the rest of the school? (Use of assembly, posters, etc.)

IV. Summary.

1. How would you sum up the means of heating our classroom?
2. How is our classroom ventilated?
3. What means are provided to keep the temperature of the room uniform?

V. Assignment for following day. (See Lesson II.)¹

LESSON II

I. Aim. To inspect the heating and ventilating system of the University High School and to have each pupil write his report on "How the University High School is Heated and Ventilated."

II. Assignment. (made at preceding meeting of class):

1. The teacher announces that during the laboratory period an inspection of the heating and ventilating system will be made. Following the inspection each pupil will write a report on it.

2. Reference (These will be found on reserve in the library.):

"The Heating and Ventilating System of the New Education Building, University of Illinois." A. C. Willard.

Blueprints showing the arrangement and how the system operates.

III. Review. A review of yesterday's lesson should be brought out by the teacher as the entire system is studied and inspected during today's lesson.

IV. Presentation of new material.

*Fact or principle to
be taught*

1. The rooms are ventilated by fresh air, which is sucked in from outside of the building, partly heated, washed and then forced to the various rooms by a large fan.

*Methods used to teach each
fact or principle*

1. (a) Blue prints of the system are studied briefly before the inspection trip is started to see if there are any points not clear.

(b) The class with the teacher as a guide visits the attic where the fresh air enters the building and the air chambers in the basement.

V. Summary. The teacher gives the following definite directions on how to write the report.

1. State the purpose of your report.

2. Discuss how the direct heating is done.

¹The assignment, although made on the first day, is reproduced in Lesson II, in order that it may appear in connection with its recitation.

3. Discuss how the ventilation system operates.
4. Describe any special separate systems connected with the ventilation system. (Air from laboratories, toilets, kitchens.)

VI. Assignment for following day.¹

¹The assignment is not reproduced as the lesson plan to which it refers is not included in this circular.

PLAN NO. 2

ENGLISH LITERATURE, MODERN DRAMA

Prepared by L. MCHARRY

Aim of the entire unit of work: To teach the appreciation of the modern English drama as a unit in itself and as a link in the chain of English drama development.

LESSON I

I. Aim. To teach the characteristics and tendencies of the modern English drama in preparation for further study and reading of drama.

II. Assignment (made at preceding meeting of class).

1. Read Miss Rich's discussion of the characteristics and tendencies of the modern drama.

What do you think she means by tendency? Make an outline of graphic nature, showing characteristics of each tendency and an example of each. Memorize the new date and the facts connected with it.

Which plays mentioned by Miss Rich have you seen acted? Do you agree with her classifications?

Which movies have you seen that would illustrate each type of modern drama?¹

Read before Thursday any one-act play from our library shelves. Thursday's class time will be given over to reports upon these plays.²

2. Textbook: A Study of the Types of Literature. p. 316-21.
Any modern one-act play from our library shelves.

III. Review.

Subject-Matter

The development of the English drama up to 1890.

Method

The teacher draws a long line across the blackboard and places

¹At this point students were urged to attend two one-act plays to be staged that night by Mask and Bauble. They were asked to be ready to offer criticisms the next day along the lines of Miss Rich's analysis.

²Three students were designated to act as "captains" for aiding other members of the class so that each type of play would be represented in the reports.

the date, 55 B. C., at one end and the date, 1924, at the other end. A student is designated to fill in the dates needed to divide the line into the periods of English literature. A second student is designated to put in the important dates and facts that have been noted thus far in our study of the development of the English drama.

IV. Development.

Subject-Matter

The beginnings of the modern drama.

Ibsen—1890

The characteristics of the various tendencies of the modern drama:

1. The Romantic Plays
2. The Realistic Plays
3. The Symbolic Plays
4. One-act Plays
5. Poetic Plays
6. Irish Plays

Outstanding differences between the modern drama and the older drama.

Method

Who will add a new date to our outline on the board?

Student volunteers and puts 1890 with name of Ibsen on the line.¹

The students are asked to give the lists of characteristics for the various tendencies of the modern drama as they have recorded them on their outlines. Sufficient repetitions are made to be sure that these are definitely enough in mind to insure intelligent discussion during the next few days.

The teacher calls for volunteers to name movies they have attended and to prove their tendencies by reference to these characteristics.

Several students read "The Servant in the House" for outside reading. We read "Hamlet" in class. A brief contrast of the

¹Three students attended the Mask and Bauble plays. At this point the teacher asks them to give their criticisms.

themes, characters, memory lines, and plots of these plays brings out the differences between the modern and older dramas.

V. Summary.

The teacher gives rapidly a list of drama characteristics and asks students to name the tendencies back of these and plays to illustrate them.

VI. Assignment for following day. (See Lesson II.)¹

LESSON II

I. **Aim.** To show what Miss Rich means by *symbolic* tendency in modern drama and to prove the adaptability of the one-act form to this tendency.

II. Assignment.

1. Read the play. Have you read or seen any other play by Gibson?

Miss Rich had many plays to choose from. Why did she choose just this play for her text? Which tendency of the modern drama predominates in this play? Prove your answer. Make a definite statement of the theme of the play. Make a study of the dramatic situations. Is the one-act form fitted to the theme and tendency of this play? Give reasons for your answer.

2. The Play, *The Family's Pride*. Text: p. 321-25.

III. Review.

Subject-Matter

Tendencies of the modern drama.

Method

The teacher passes out pieces of paper and explains to the students that they are to answer in single-word form the questions to be given.

1. When did modern drama begin?

2. Under whose leadership?

¹See footnote, p. 10.

3. What did Miss Rich consider the three tendencies of the modern drama?

4. Name two characteristics of each tendency.

5. Name a play to illustrate each tendency.

IV. Development.

Subject-Matter

The Family's Pride by Gibson is a play of symbolic tendency. It is a one-act play expressing the mystery of death in a unified way.

Method

(This lesson is to encourage class discussion. The following questions are to be used as leads by the teacher. Individual students may be called upon and volunteers should be encouraged.)

1. The Play, *The Family's Pride*, is an expression of which tendency in modern drama?

2. Give definite reasons for your answer.

3. What is the theme of the play?

4. Have you read any other play of like theme?

5. Enumerate details that grow into the general effect of mystery.

6. How many dramatic situations are there in the play?

7. How is this situation developed and how is it relieved?

8. Could this theme have been lengthened into five acts?

9. What is gained by writing it in one act?

10. What is the effect upon this single impression of the entrance of the daughter-in-law and the baby?

V. Summary.

Write a twenty-five word statement about *The Family's Pride*. Imagine that this statement is to be posted in the library to interest other students in the play but not to tell them too much.

VI. Assignment for following day.¹

¹See p. 11.

PLAN NO. 3.

AMERICAN HISTORY

Prepared by I. O. FOSTER

LESSON I

I. Aims.

1. To show how the problem of "Reconstruction" was attacked and the part that political rivalry played in its early stages of solution.
2. To point out how the lack of tact on the part of a high official can contribute to the defeat of high purposes.

II. Assignment. (made at preceding meeting of class.)

III. Review on Statement of Problem.*

Subject-Matter

Method

1. The seceded states.

(a) Names.

1. (a) How many states had seceded?

(b) Name them.

(c) A pupil is asked to show them on the map.

2. Treatment of the South by Grant and Lincoln at the close of the War.

2. (a) How had Lincoln treated the South at the close of the Civil War?

(b) How had Grant treated the South at that time?

3. How the process of Political Reconstruction had been attacked before April 30, 1866.

3. (a) What big problem faced the administration of President Johnson?

(b) After discussion a pupil is asked to write the problem on the board.

*EDITOR'S NOTE—Mr. Foster, the author of these lesson plans, has abbreviated many of his statements. This is legitimate in planning lessons but the reader will find it necessary to supply many words in order to understand clearly the method which Mr. Foster had in mind.

IV. Presentation of New Material.

Subject-Matter

1. Meaning of Reconstruction.

2. Possible Methods of Reconstruction.

3. Lincoln's Policy of Reconstruction.

4. Johnson's Policy of Reconstruction.

5. Black Codes.

Method

1. (a) Ask students to explain the meaning of Reconstruction.

(b) Compare conditions after the Civil War with conditions in Europe after the World War.

(c) Discussion of kinds of Reconstruction by pupils.

(d) Call attention to fact that this lesson deals only with *Political* Reconstruction.

2. (a) Call on definite pupils to list the methods of Reconstruction as a student writes them on the board.

(b) Ask poor students for explanations in order to make sure all understand.

(c) Correction of any errors by volunteers.

3. (a) Call on definite pupils to explain.

(b) Volunteers explain "reasonableness."

(c) Certain pupil tells of Lincoln's difficulties in this work.

4. (a) Definite pupil compares with that of Lincoln.

(b) Volunteers explain why he had more trouble than Lincoln.

5. (a) Explanation by certain pupils.

(b) Discussion of legality by pupils.

(c) Discussion of "reasonableness."

6. Johnson's Quarrel with Congress.

6. (a) How it progressed, by certain pupil.

(b) Whose fault it was, by volunteers.

(c) Generalization by teacher in terms of aims.

V. Assignment for following day. (See Lesson II.)¹

LESSON II

I. Aims.

1. To show how Political Reconstruction was finally accomplished.
2. To point out that evils are likely to accompany partisan acts.
3. To show why the "Solid South" remained Democratic.

II. Assignment (made at preceding meeting of class):

1. Teacher sets the following problems by dictation:
 - (a) How was the problem of Political Reconstruction really solved?
 - (b) Why was it solved this way?
 - (c) What evils attended its solution?
2. Text p. 385-90. Extra Credit Reading.²

¹See footnote, p. 10.

²The extra credit reading list given below is used in connection with the two lesson plans reproduced. Each pupil is given a copy of the list and is required each day to place on the teacher's desk a slip containing his name, the exact reference and the topic discussed. He also keeps in his notebook a synopsis or outline of all extra credit reading.

1. Dunning. Reconstruction. (Am. Nation). Chaps. I-V.
2. Elson. Sidelights on American History. Chap. VII.
3. Fish. Development of American Nationality. Chap. XXIII.
4. Fleming. Sequel of Appomattox. Any part.
5. Hart. Contemporaries. Vol. IV, p. 145-53.
6. Hart. Select Writings of Lincoln. p. 331-37.
7. Hosmer. Outcome of Civil War. (Am. Nation). Chap. VIII.
8. MacDonald. Select Documents. p. 42-44; 50-52; 56-62.
9. Paxson. Civil War. p. 174-85.
10. Rhodes. History of U. S. Vol. V, Chap. XXX; Vol. VI, Chaps. XXI-XXXII.

III. Review.

Subject-Matter

1. Methods of Reconstruction.

2. Reasons for Quarrel.

Method

1. Eight minute written test on these questions:

(a) List the possible methods that have been used in reconstructing the South.

(b) Why did Johnson and Congress quarrel?

IV. Presentation of New Material.

Subject-Matter

1. Fourteenth Amendment.

2. Reconstruction Act.

Method

1. (a) Pupil shows importance of the solution of the problem.

(b) Class turns to actual statement in appendix.

(c) Analysis of all important points.

2. (a) Various pupils give provisions.

(b) Provisions placed on board by pupil.

(c) Pupil shows military districts on map.

(d) General discussion of these questions:

(1) The wisdom of immediate negro suffrage?

(2) Attitude of North toward enforcing it?

(3) Character of Reconstruction government?

(4) Justification for Ku Klux Klan?

(5) Was Reconstruction a crime? Why?

(6) Feeling of one section towards other?

(e) Illustrate by Dixon's "Clansman."

V. Summary and Generalization.

- | | |
|--|--|
| 1. Summary | 1. Contributed by pupils. |
| 2 Generalization: "The Solid South" is a political survival of the intense feeling of Reconstruction days. | 2. Relation between this conflict and the Solid South, presented as problem. |

VI. Assignment for following day.¹

¹See p. 11.

PLAN NO. 4

BOTANY

Prepared by W. C. CROXTON

LESSON I

An Introductory Lesson on Our Relations with Plants

I. Aims.

1. To arouse interest in plants.
2. To give a "Mind set" for the study of botany.
3. To aid pupils to interpret their environment.
4. To afford practice in reflective thinking.

II. Assignment (made the previous day.)

1. Problem: In what ways do plants affect us?¹
 - (a) Make a list of industries, occupations, professions, skilled and unskilled labor in Champaign-Urbana and underline those which are largely dependent directly upon plants or plant products.
 - (b) State all of the ways in which plant products have influenced your life today.
2. Suggestions for study:
 - "Where will you get the material for this study?"
 - "If in doubt as to whether any product is from plants, what will you consult?"

III. Presentation: (Clear up period.)

Subject-Matter

Occupations
Coal dealer
Grocer
Butcher
Confectioner
Jeweler
Lumber dealer
Gas and Oil Co.
Florist

Method

As pupils enter the room, they will be asked to place on the blackboard anything they have worked out in their first approach to the solution of our problem.
From these separate lists the class will make up a composite list on the board, a student acting as recorder.

¹A few minutes will be devoted to a group discussion of the problem. Pupils will be encouraged to make statements of the ways in which plants affect our lives.

- Fruit growers
- Truck gardeners
- General farmers
- Stock growers
- Hardware dealers
- Druggists
- Mechanics
- Carpenters
- Plumbers
- Etc.

(A list of fifty, more or less depending upon the experiences, ability and industry of the student and upon the locality.)

Ways in which plants entered into my life today.

1. My home is principally of wood.

2. Tables, chairs, bed, dresser, etc. are made of wood.

3. I slept on a cotton mattress.

4. My bed clothes were cotton, linen, silk.

5. My clothing is of cotton, linen, artificial silk (wood pulp) rubber.

6. My breakfast and lunch were largely of plant products.

7. My house was heated and my food cooked by burning products, thought to be formed largely of plants.

8. My books, the newspaper I read and my writing paper are made from plants.

9. My home ground, the streets and the school grounds are made beautiful with plants.

Differences in opinion as to what should be underlined will result in discussions. Where failure to agree is due to lack of information, encyclopedias and other sources will be consulted. Where the evidence is practically equal on both sides, each student will use his judgment in making up his own records and may make a separate column for these cases if he wishes.

The teacher will supplement where necessary.

Pupils will in turn read aloud their lists of ways in which plants have entered into their lives this day. As each student reads, the others will add to their own individual lists as new ideas are suggested to them. The student having the most complete list at the end of the readings will read it to the class and will be asked to make a copy of it for the bulletin board.

Plans for continuing the study of our problem tomorrow will then be made.

10. Other uses: in medicines,
pencils and pens, street car on
which I rode to school, etc.

IV. Assignment for following day (See Lesson II.)¹

LESSON II

Our Relation With Plants

I. Aims:

1. To arouse interest in plants.
2. To give a "Mind set" for the study of botany.
3. To aid pupils to analyze life situations.
4. To afford practice in reflective thinking.
5. To correlate botany with English and physiology.

II. Assignment. (made the previous day.)

1. Problem. In what ways do plants affect us?

Are there other ways in which plants are important to us?

- (a) Summarize in a single statement the direct dependence of the occupations upon plants.
- (b) In a brief paragraph on each, state the relationship of plants to our food, clothing, shelter, warmth and conveniences.
- (c) Make a list of the well-known diseases of man. Check those which are known to be caused by plants.
- (d) State in your own words the meaning of the poem on the fly leaf of your text. Bring to class some poem you are unable to understand because of lack of knowledge of plants.

2. Suggestions for study.

"Where can the information we need for exercise (c) be found?" "What plants cause diseases of man?" No attempt will be made to study bacteria at this time. The teacher will make only such statements concerning them as will be necessary to enable pupils to find the information needed at present. Pupils will be asked to raise questions at this time if they do not understand clearly what is to be done or if they wish further suggestions.

¹See footnote, p. 10.

III. Presentation.

Subject-Matter

A large part of our occupations are directly concerned chiefly with plant products.

Vegetables, grains and fruits constitute the large part of our diet. We eat every part of plants. Most of our condiments are from plants. Indirectly plants are the source of all of our food.

Cotton is the principal clothing material of the world. In addition, linen is widely used. Artificial silks made largely of wood pulp are becoming increasingly important. Jute and straw are also used. Our raincoats and overshoes are entirely or in part of rubber.

Most of our houses are built of wood. Wood is used as interior finish in houses built of other materials.

Coal, oil and gas are believed to have been formed largely of the remains of plants. Wood is still used as fuel in many cases.

Wood and rubber are used in making many of our common implements and articles of convenience such as handles for tools, combs, tires, etc.

A list of diseases will be placed upon the blackboard before the class enters the room.

Method

The first two exercises are in the nature of review and will occupy but little of the class period. Several pupils will be called upon to read their summaries or paragraphs on each topic. All pupils will thus be involved in this phase of the recitation. The class will discuss the reports given.

Some of the slower pupils will be asked to check those that are caused by plants. Additions and corrections will be made by other pupils and finally by the teacher

Passages from many poems.
(Only a few can be listed here.)

"When Daffodils Begin to
Peer" from "The Winter's
Tale."—*Shakespeare*.

"Spring." From "In Memor-
iam."—*Tennyson*.

"When the Hounds of Spring."
Chorus from "Atalanta in
Calydon."—*Swinburne*.

"June." From the prelude to
"The Vision of Sir Launfal."
—*Lowell*.

"Trees."—*Kilmer*.

"A Ballad of Trees and the
Master."—*Lanier*.

IV. Assignment for following day.¹

until a list, as correct as our present knowledge permits, is arrived at.

Pupils will be asked the meaning of the poem in the text. A class discussion will follow.

Pupils will read passages they do not understand from the poems they have selected. The teacher will attempt to explain these if no other member of the class is able to do so.

The remainder of the time (except that reserved for the assignment) will be spent in reading poems selected by the teacher. Pupils will be asked the meaning of passages relating to plant life or the pupils may question the teacher.

¹See p. 11.

PLAN NO. 5

ALGEBRA I

Prepared by S. HELEN TAYLOR

LESSON I

Development of Addition of Fractions

I. **Aim:** To aid the class in formulating a plan for adding fractions with monomial denominators.

II. **Assignment** (made previous day.)

1. Problems 1-10, p. 141; Problems 15, 16, 19, 20, p. 142.¹
2. Text: First Course in Algebra. Rietz, Crathorne, and Taylor, Holt and Company.

III. **Review and Development of New Topic.**

Subject-Matter

1. A fraction is one or more of the equal parts into which a whole has been divided; or an expressed division; ($3 \div 5$ written in form $\frac{3}{5}$).

2. Numerator is the first term or dividend, and denominator is second term or divisor.

3. A numerator numbers the parts to be taken, a denominator names the kind taken; or the numerator is the dividend, denominator the divisor.

4. Changing to equivalent fractions by multiplying and dividing by a common factor, also change of signs in fractions.

Method

(Direct questioning with board work.)

1. State a definition of a fraction. (Ask of slow students until it is well formulated.)

2. What are its parts?

3. Explain the meaning of these words. (The Latin students will volunteer here.)

4. In the past week's work with fractions what operations have we considered? (Teacher lists these.)

¹This written work constitutes a second day on reducing fractions to lowest terms by dividing both numerator and denominator by a common factor. It is handed in near end of hour.

5. Numerator and denominator of a fraction may be multiplied by the same number without changing the value of the fraction.

6. Only similar terms can be added.

7. Similarity indicates that fractions are alike in kind or name, hence the denominators are alike.

8. With simple fractions from arithmetic as $\frac{1}{2}$ plus $\frac{1}{3}$ plus $\frac{3}{6}$ and finally with $\frac{1}{a}$ plus $\frac{1}{3a}$, and $\frac{1}{x}$ plus $\frac{1}{x^2y}$ the three steps of the plan are formulated.

(a) The L.C.M. of the denominators is chosen.

(b) Each fraction is changed to an equivalent fraction with this denominator.

(c) The numerators are added and the result written over the L.C.D.

IV. Generalization.

The plan discussed in (8) will be written out step by step with a type problem, i.e., $\frac{1}{xy}$ plus $\frac{y}{x^2}$ plus $\frac{3}{xy^2}$.

V. Assignment for following day. (See Lesson II.)¹

5. Will you give one fundamental principle which will justify our work?

6. In addition of fractions we shall need to recall our ideas about algebraic addition. What are the important facts?

7. When are fractions similar? (Let examples be given first. This is a new word as applied to fractions but after illustrations are offered, class will decide on meaning in this case.)

8. The teacher suggests that several go to the board and add some fractions. While they do this she will give a problem for remainder to work on scrap paper. Let some pupil suggest fractions containing letters in denominators, for pupils enjoy making their own problems, thus getting on the inside of it all. From the problems now on the board, a plan will be made orally.

The teacher will have one of the best pupils work out a type problem writing the reason by each step.

LESSON II

I. Aim. To test and drill on addition of fractions with monomial denominators and to introduce polynomial denominators.

¹See footnote, p. 10.

II. Assignment.

1. Exercises.

(a) Perform orally the addition on p. 144, Nos. 1-10.

(b) Write out problems 1-10, p. 145.

(c) Be able to state clearly what you are doing.

2. Text: First Course in Algebra. Rietz, Crathorne, and Taylor.

III. Procedure.

Subject-Matter

1. Questions on the oral problems, or on ten written problems assigned yesterday may be asked by the pupils.

(Not more than 10 minutes.)

2. Drill on simple addition problems. "Oral Algebra," by Golden and Fenno, pages 50-51.

(Not more than 15 minutes.)

3. Development of new work. Bring out the fact that polynomial denominators do not afford a new type of problem, i.e. $\frac{3x}{x^2-y^2}$ plus $\frac{4}{x+y}$ plus $\frac{2y}{x-y}$ involves the changing of each fraction to an equivalent fraction with a common denominator, and then the addition of numerators.

(Not more than 10 minutes.)

4. Board work, on problems of type assigned for tomorrow.

(Not more than 10 minutes.)

Method

1. Difficulties are to be met by pupils who volunteer, unless the teacher sees need of calling on some particular pupil.

2. Teacher skips around in list and in class so that each student is thinking of same problem, not of the one ahead. Name problem and allow 3 to 5 seconds to elapse, then name pupil. Make it snappy. See that the poorer students get at least two chances.

3. Teacher asks for fractions with polynomial denominators, calls for suggestions in the work and gets a student to show how it is worked.

4. Teacher dictates a problem, watches the work of as many as she can, making suggestions by question rather than definite statement. To avoid being kept busy by one or two poor students, one or two of the better

students, on completion of a problem, may be assigned to assist another pupil.

IV. Assignment for following day.¹

¹See footnote, p. 11.

PLAN NO. 6
LATIN
Drill Lesson

Prepared by RACHEL L. SARGENT

I. Aim.

1. Immediate: to teach fourth declension, a new vocabulary, to review case uses of nouns by means of a translation exercise.
2. Ultimate: to increase pupils' facility in translating Latin, to improve their use of English, to provide a background of information concerning Roman civilization, to demonstrate the value of knowledge of Latin in mastering other high-school subjects.

II. Assignment. (made previous day.) Textbook: Place's Beginning Latin. p. 203-06.

III. Review. In this lesson to be given in connection with the advance work as indicated.

IV. Presentation of New Material.

Subject-Matter

1. Vocabulary (which has not been assigned to be memorized but has been used in preparing the translation exercise).

2. Pronunciation and translation of Latin exercises into English.

(20-25 minutes for 1 and 2)

Methods and Devices

1. Pupils read the words aloud from perception cards held by a volunteer student while teacher takes the roll. Words then assigned for the next day to be memorized thoroughly along with English derivatives. Teacher during this class, however, builds up associations to fix words in their memory.

2. Class looks at each sentence carefully a few seconds then one student is chosen to pronounce the Latin through without a pause and with proper emphasis. Whoever cannot do this successfully must read the whole exer-

3. Fourth Declension has been previously assigned to be memorized along with the rules for gender. The exercises just translated, which have contained eight fourth declension nouns in the different cases.

(15-20 minutes.)

cise to the class rapidly the next day. These sentences (which have been translated outside the class) are then translated rapidly one after the other with no reference to papers brought to class.

3. Teacher asks pupils, all of them, to count the number of fourth declension nouns, number finally determined. One person at a time is asked to tell the case and the reason for its use of each of these nouns, which the teacher has listed by now on the board. The gender of each is determined by looking at its limiting adjective or consulting the vocabulary. Finally she calls on a pupil to make a complete statement as to the gender of nouns of the fourth declension and the principal exceptions; calls on another to decline a fourth declension noun, singular and plural. The class in unison recites the endings with attention to long marks. Teacher writes on the board five or six nouns at some distance from each other and sends the quicker pupils to the board to write out their declension in full. (She will send the slower ones the next day for the same thing.) Meantime during these two or three minutes those in the seats may ask each other as hard questions as they can think of about case endings, etc. of fourth declension nouns. Board work is quickly corrected and graded.

V. Assignment for following day. (See Lesson II.)¹
(5-8 minutes)

VI. Summary.

After the assignment, if there is a half minute or so before the bell the teacher has the class run through the fourth declension in unison or through the vocabulary cards.

LESSON II

Translation Lesson, Latin to English and vice versa.

I. Aim.

1. Immediate: to review second and fourth declensions, vocabulary, write English into Latin, translate Latin story, discuss the Dative of Possessor.
2. Ultimate: the same as in the preceding lesson.

II. Assignment.

1. Review second declension and fourth declension.

1. Class is requested to bring in "Magnus exercitus" carefully written out in all cases as requested in the suggestions for study, p. 204 of text; also any other fourth declension noun and, second declension adjective they care to select, being careful to make agreement in gender. They are cautioned to recite these out loud at home.

2. Vocabulary.

2. The class is again reminded to have the fourteen words thoroughly memorized with genitive and gender of nouns and all principal parts of verbs. They are already practically learned from so much use of them, during this class period.

3. English sentences into Latin.

3. The first three English sentences in Exercise B are to be

¹See footnote, p. 10.

4. Translation of the story,
"The Haunted House."

5. Two pictures in the text.
(optional).

written into Latin.

4. Teacher arouses interest for the rest of the assignment by telling just enough about the story to whet their curiosity. In this case she might ask if anyone had ever known of a "haunted house" and in what way the ghost appeared. Tells them that in this case the philosopher finds out exactly why the ghost was appearing. Allows class to estimate what would be a fair amount of the story to assign. Stimulates those who can read Latin more quickly by saying that she would be very much pleased to have a few, if possible, read all of the story. Encourages them all to practice reading it quickly by getting them to guarantee as a class to read the assignment in a certain number of minutes.

5. Teacher does not forget to mention the illustrations in the lesson—the two pictures of an Athenian coin and a Roman lamp bearing the figures of Mercury, bringing a soul to Charon to ferry across the Styx. Calls for three volunteers to be ready to give a minute report on coins used at Athens, lamps, and meaning of the Mercury-Charon picture. This work is entirely optional and brings no definite increase of credit, merely the approval of the teacher and class next day.

III. Review.

Subject-Matter

- 1. Second and fourth declensions.

Methods and Devices

1. Required papers quickly collected personally by teacher who refuses to accept any obviously poor ones. Such pupils must pass in better ones by a specified time. The class recites in unison a fourth declension noun, then a second declension noun. Several of the students, preferably the slower ones, at the board, decline sample nouns. Meantime those (if any) who failed to read or pronounce satisfactorily the day before, before the class, read to the class the exercises which they have now specially studied. Written work at the board is quickly graded.

- 2. Vocabulary.
(15-20 minutes for 1 and 2.)

2. Teacher holds up the fourteen cards, which have been used the previous day, with English side towards the students, calls on individuals to give the Latin on the other side, including the genitive case, gender of nouns and principal parts of verbs. Volunteers then give English sentences which they have thought of containing the English derivatives of the Latin words. All the rest of the lesson involves a constant review of grammatical principles and forms.

IV. Presentation of New Material.

Subject-Matter

- 1. Three English sentences into Latin.

Methods and Devices

1. Teacher asks one pupil after the other, case or tense and Latin

(Such as: "The senate will choose a house suitable for the highest magistrate." These were supposed to have been studied outside of class.)

(10 to 15 minutes.)

2. Translation of short story, "The Haunted House."

(A portion of which had been assigned for preparation outside of class.)

(15-20 minutes.)

form of each word to be put into Latin in the first sentence. After the sentence is thus dissected, calls on a pupil to give the entire sentence in Latin rapidly; finally sends another pupil to write it on the board without book or paper. (He may glance at teacher's book if he has forgotten the English.) Class meantime, while first sentence is being put on the board, considers the second sentence, etc. Teacher or pupil (volunteer) marks the errors, if any, in the three sentences on the board. Class is directed to write out the last two sentences the next day.¹

2. Teacher may ask a question such as: "What did the philosopher's house look like," or "What kind of lamp did he hold when he went out to the garden?" She then may ask some of the laziest pupils a few pointed questions about the story to see if they have actually read it. If they have not she does not let them attempt any sight translation of it but requires them to read the whole story before the class the next day. If they need assistance they may see her about it outside of class. The story is now translated by pupils who read at least one paragraph at a time in good Eng-

¹After the drill, class has a sort of intermission of about five minutes while those who volunteered give short reports as to the Roman house, the coin of Athens and lamp in the pictures.

lish. Before each paragraph is read, a moment is taken for all to look it through and to ask any questions. Volunteers finish the story; if there are none the teacher reads it herself. Two pupils called up to read the story in Latin expressively, now that it has been translated.

V. Assignment. (for following day.)¹

¹See p. 11.

PLAN NO. 7

FOODS

Prepared by ANNA BELLE ROBINSON

Length of period—100 minutes.

Place—University High School.

Materials used—pictures of cuts of beef, drawing of beef on black-board, recipe cards, round steak, etc., cards with cuts of beef design, etc.

I. Aim.

Teacher's Aim

1. To teach the underlying principles in the preparation of a tough cut of meat.

2. To teach the names of various cuts of beef, characteristics, and manner of preparation.

Pupils' Aim

1. To learn how to prepare Swiss steak.

2. To learn cuts of beef, characteristics and manner of preparation.

II. Presentation: Discussion and Drill.

Subject-Matter

1. It is a cut from the round.
2. Rather round in shape, a round bone, not much fat and not much waste.

3. Locates cut.

4. It is a rather tough cut.

Method

I have posted some pictures of various cuts of meat. Please look at them carefully and then I am going to ask someone to tell me the name of the cut I have on the table.

1. What do you think it is?
2. What are the characteristics of a cut from the round?
3. Will you please go to the board and locate the cut on the picture of the beef I have drawn on the board?
4. From its location is it a tender, tough or medium tough cut?

5. Because the muscles of that part of the animal are exercised.

6. It will have to be cooked in the presence of moist heat in order to soften the connective tissue.

7. Recipe for Swiss steak.

5. Why do you say that?

6. From our experiments yesterday how will this have to be prepared to be made tender?

7. I have placed cards on your desk giving directions how this is to be prepared. I am going to give you 3 minutes to read them and then I shall ask someone to tell me what to do.

You may tell me how we are going to prepare the meat.

I am going to give you all a piece of the steak and you are each to prepare a small Swiss steak.

8. What are we to use to pound the steak?

Laboratory Work

(As the meat is cooking the following discussion is carried on.)

9. To break down some of the connective tissue.

9. Why did we pound the steak?

10. It kept the juices from being pounded out on the board.

10. But we pounded flour into it. Was there any reason for that?

11. Flour will make it have a prettier brown and make it taste better.

11. Does it do anything else?

12. We sautéed the meat in hot fat. This made it have a brown crust and also kept the juices in by searing over the outside.

12. Yes. What did we do next, and why?

13. We added hot water almost enough to cover it and are letting it simmer for 60 minutes.

13. Lastly, what did we do?

14. Because moist heat dissolves part of the connective tissue and makes the meat more tender.

15. I noticed the piece I had flattened out when I pounded it and I should think one would pound it to pieces if it were thin.

16. Pound steak to break down connective tissue. Pound flour in steak to retain juices. Brown steak to improve flavor also to retain juices. Use water in cooking to dissolve part of connective tissue.

III. Review.

Check on previous day's assignment.

IV. Comparison—Eating—and Dishwashing.

14. Who will volunteer to tell me why we did this?

15. Did you notice the steak was cut about two inches thick?

Why do you suppose we had it cut so thick?

That is true. Also it is customary to have Swiss steak thicker.

16. Now will you please sum up all the principles of cooking tougher cuts of meat we have learned in the preparation of Swiss steak?

I am now going to pass out cards with a picture of a beef on them. The cuts are designated but not named. You may name them and tell whether they are tough or tender also how they may be used. I will give you ten minutes for this.

We still have 10 minutes left before our steak is done. You may wash your dishes and get ready to serve your steak.

When your steaks are done bring them on a plate to the supply table for comparison.

If you were making Swiss steak at home would you cut it in pieces as we have?

Do your mothers ever fix
Swiss steak a little differently?

Time allotment

Review and Instruction	8 min.
Preparation of Swiss steak	15 min.
Discussion, drill, etc.....	60 min.
Comparison	3 min.
Eating and final dishwashing.....	14 min.
	<hr/>
	100 min.



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